DOCKET NO.: MSFT-1166

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

ANGUS DORBIE

Confirmation No.: 8083

Serial No.: 09/247,816

Group Art Unit: 2671

Filing Date: 2/9/99

Examiner: HUEDUNG X CAO

For: METHOD AND APPARATUS FOR EARLY CULLING OF OCCLUDED

OBJECTS

Box DSD
Commissioner for Patents and Trademarks
Washington, DC 20231

POWER OF ATTORNEY WITH REVOCATION

Revoking any and all powers of attorney heretofore given in the matter of the above-entitled application, the undersigned, assignee of the entire interest in the above-identified application, hereby appoints Steven J. Rocci, Registration No. 30,489, of the firm Woodcock Washburn LLP, One Liberty Place – 46th Floor, Philadelphia, Pennsylvania, as attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith.

In addition, the assignee also appoints the following attorneys listed below of

MICROSOFT CORPORATION, One Microsoft Way, Redmond, Washington 98052 with

full power of substitution and revocation, to prosecute this application, to make alterations

and amendments therein, to receive the patent and to transact all business in the Patent and

Trademark Office connected therewith.

Daniel D. Crouse   Registration No. 32,022

Send all future correspondence and address all telephone calls to:

> Steven J. Rocci
> WOODCOCK WASHBURN LLP
> One Liberty Place - 46th Floor
> Philadelphia, PA 19103
> Telephone: (215)568-3100

STATEMENT UNDER 37 C.F.R. 3.73(b)

MICROSOFT CORPORATION, a corporation of the **State of Washington,**

states that it is the assignee of the entire right, title, and interest in the patent

application/patent identified above by virtue of:

A.   ☐ An assignment from the inventor(s) of the patent application/patent

identified above.

☐ 1.   The assignment was recorded in the Patent and Trademark

Office at Reel _____ Frame _____.

☐ 2.   The assignment has not yet been recorded. A copy of the

assignment is attached.

OR

B.   ☐ A chain of title from the inventor(s), of the patent application/patent

identified above, to the current assignee as shown below:

From the inventors to: <u>Silicon Graphics, Inc.</u> The document was recorded in the U.S. Patent and Trademark Office on February 9, 1999, at Reel 9784, Frames 0600. A copy thereof is attached.

From: **<u>Silicon Graphics, Incorporated</u>** To: **<u>Microsoft Corporation,</u>** dated September 28, 2001. This assignment has not yet been recorded. A copy thereof is attached.

☐   Copies of assignments or other documents in the chain of title are attached.

The undersigned has reviewed all the documents in the chain of title of the patent application identified above and, to the best of undersigned's knowledge and belief, title is in the assignees identified above. The undersigned (whose title is supplied below) is empowered to act on behalf of the assignee, **MICROSOFT CORPORATION**.

Respectfully submitted,

Date: 12/2/02

Name: DANIEL D. CROUSE
Title: Assistant Secretary

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MAY 19, 1999

GRAHAM & JAMES LLP
JOSEPH K. HOLLINGER
600 HANSEN WAY
PALO ALTO, CA 94304-1043

PTAS

100976048A

UNITED STATES PATENT AND TRADEMARK OFFICE
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

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RECORDATION DATE: 02/09/1999   REEL/FRAME: 9784/0600
                                      NUMBER OF PAGES: 2

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).

ASSIGNOR:
  DORBIE, ANGUS   DOC DATE: 02/09/1999

ASSIGNEE:
  SILICON GRAPHICS, INCORPORATED
  2011 N. SHORELINE BOULEVARD
  MOUNTAIN VIEW, CALIFORNIA
  94043-
    1389

SERIAL NUMBER: 09247816   FILING DATE: 02/09/1999
PATENT NUMBER: ISSUE DATE:

DATES ENTERED: No Action

MARY BENTON, EXAMINER
ASSIGNMENT DIVISION
OFFICE OF PUBLIC RECORDS

MAY 27 1999

BY _KLM_ CALENDARED
ATTORNEY
GRAHAM & JAMES (PA) IP DEPT.

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SHEET

Y

Docket No.: 20545.00064(15-4-767.00)

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

▼   ▼   ▼

To the Honorable Commissioner of ... .d the attached original documents or copy thereof.

1. Name of conveying party(ies): mRd
Angus Dorbie

2-9-99

Additional names(s) of conveying party(ies) ☐ Yes ☒ No

2. Name and address of receiving party(ies):

Name: **Silicon Graphics, Incorporated**

Address: **2011 N. Shoreline Boulevard**

City: **Mountain View**   State/Prov.: **CA**

Country: **US**   ZIP: **94043-1389**

Additional name(s) & address(es) ☐ Yes ☒ No

3. Nature of conveyance:

☒ Assignment   ☐ Merger

☐ Security Agreement   ☐ Change of Name

☐ Other _____

Execution Date: **February 9, 1999**

4. Application number(s) or registration numbers(s): 09, 247816

If this document is being filed together with a new application, the execution date of the application is: **February 9, 1999**

Patent Application No.   Filing date

B. Patent No.(s)

Additional numbers ☐ Yes ☒ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: **Joseph K. Hollinger**

Registration No. **40,649**

Address: **Graham & James LLP**

600 Hansen Way

City: **Palo Alto**   State/Prov.: **CA**

Country: **US**   ZIP: **94304-1043**

6. Total number of applications and patents involved: 1

7. Total fee (37 CFR 3.41):..................$ **40.00**

☒ Enclosed - Any excess or insufficiency should be credited or debited to deposit account

☐ Authorized to be charged to deposit account

8. Deposit account number:

05-0150

DO NOT USE THIS SPACE

9. Statement and signature.
To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Joseph K. Hollinger, Reg. No. 40,649

Name of Person Signing

Signature

2/9/99

Date

2

Total number of pages including cover sheet, attachments, and

ASSIGNMENT

Attorney Docket No. 20545.00064(15-4-767.00)

(1-8)   Insert Name(s) of Inventor(s)

(1) <u>Angus Dorbie</u>   (5)_____

(2) _____   (6)_____

(3) _____   (7)_____

(4) _____   (8)_____

For good and valuable consideration receipt of which is hereby acknowledged, the undersigned agree(s) to assign, and hereby do(es) assign, transfer and set over to:

(9)   Insert name of Assignee

(9) <u>Silicon Graphics, Incorporated</u>

(10)   Insert state of incorporation of Assignee

(10) <u>Delaware</u>

(11)   Insert address of Assignee

(11) of <u>2011 N. Shoreline Boulevard, Mountain View, CA 94043-1389</u>
(hereinafter designated as the Assignee) the entire worldwide right, title and interest in the invention known as

(12)   Insert Identification of Invention, such as Title, Case Number or Foreign Application Number

(12) <u>Method and Apparatus For Early Culling Of Occluded Objects</u>
(Case No. 20545.00064)(15-4-767.00) (Serial No. UNASSIGNED) for which the undersigned has (have) executed an application for patent in United States of America

(13)   Insert Date of Signing of Application

(13) on <u>February 9, 1999</u>

1)   The undersigned agree(s) to execute all papers necessary in connection with the application and any continuing or divisional applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

2)   The undersigned agree(s) to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation or division thereof and to cooperate with the Assignee in every way possible in obtaining evidence and going forward with such interference.

3)   The undersigned agree(s) to execute all papers and documents and perform any act which may be necessary in connection with claims or provisions of the International Convention for Protection of Industrial Property or similar agreements.

4)   The undersigned agree(s) to perform all affirmative acts which may be necessary to obtain a grant of a valid United States patent to the Assignee.

5)   The undersigned hereby authorize(s) and request(s) the Commissioner of Patents and the duly constituted authorities of foreign countries to issue any and all Letters Patents resulting from said application or any division or divisions or continuing or reissue applications thereof to the said Assignee, its successors and assigns, as Assignee of the entire right, title and interest, and hereby covenants that he has (they have) full right to convey the entire interest herein assigned, and that he has (they have) not executed and will not execute, any agreement in conflict herewith.

6)   *The undersigned hereby grant(s)*
David L. Fehrman, Reg. No. 28,600;David L. Henty, Reg. No. 31,323;William J. Robinson, Reg. No. 29,430;Stuart L. Merkadeau, Reg. No. 33,262;David B. Abel Reg. No. 32,394;Hisako Muramatsu, Reg. No. 34,955;Brian M. Berliner, Reg. No. 34,549;David J. Meyer, Reg. No. 33,425;Vincent J. Belusko, Reg. No. 30,820; Minda Schechter, Reg. No. 38,296;Victor De Gyarfas, Reg. No. 40,583;Dennis R. Gallagher, Reg. No. 42,563;Wayne Smith, Reg. No. 42,160; Stefan J. Kirchanski, Reg. No. 36,568 Joseph K. Hollinger Reg. No. 40,649; Marc A. Sockol Reg. No. 40,823;Linda Beach Reg. No. 36,446; Harmohinder S. Bedi Reg. No. 39,904; Benjamin Rubin Reg. No. P44,310;Leah Sherry Reg. No. P43,918;Christopher Byrne, Reg. No. 32,204;Steven Weiner, Reg. No. 38,360;John Brigden, Reg. No. 40,530.

the power to insert on this assignment any further identification which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office for recordation of this document.

Date <u>9th Feb 99</u>   Name of Inventor(s) _____

Date_____   Name of Inventor(s)_____

Date_____   Name of Inventor(s)_____

Date_____   Name of Inventor(s)_____

Date_____   Name of Inventor(s)_____

EXHIBIT A

ASSIGNMENT

WHEREAS, SILICON GRAPHICS, INC., a Delaware Corporation, (hereinafter referred to as "Assignor") owns all right, title and interest in and to the inventions, patents and patent applications (hereinafter referred to as the "Intellectual Property") identified in Schedule A attached hereto; and

WHEREAS, MICROSOFT CORPORATION, a Washington Corporation, (hereinafter referred to as "Assignee"), is desirous of acquiring the entire domestic and foreign right, title, and interest in and under the Intellectual Property.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor assigns and transfers to the Assignee and the Assignee's legal representatives, successors and assigns, pursuant to the terms of a concurrently executed Confidential Patent Assignment Agreement, its full and exclusive rights in and to the Intellectual Property in the U.S. and every foreign country and its entire right, title, and interest in and to the Intellectual Property and related applications (e.g., provisional applications, non-provisional applications, continuations, continuations-in-part, divisionals, reissues, reexaminations, National phase applications, including petty patent applications, and utility model applications) that may be filed in the United States and every foreign country on the Intellectual Property, and extensions or derivations thereof, both foreign and domestic, that may issue thereon, and we do hereby authorize and request the Commissioner of Patents to issue U.S. patents to the above-mentioned Assignee agreeably with the terms of this assignment document.

ASSIGNOR HEREBY AUTHORIZES the Assignee to insert in Schedule A to this assignment document the filing date and application number of any application if the date and number are unavailable at the time this document is executed.

UPON SAID CONSIDERATION, Assignor conveys to the Assignee the right to make application in its own behalf for protection of the Intellectual Property in the U.S. and countries foreign to the U.S. and to claim under the Patent Cooperation Treaty, the International Convention and/or other international arrangement for any such application the date of any earlier U.S. application (or any other application on the invention) to gain priority with respect to other applications.

IN WITNESS WHEREOF, Assignor has caused one of its officers to hereunder set his hand on the date shown below.

Date _9/28/01_

Sandra Escuer

Senior Vice President
Title

STATE OF _Washington_)
) SS:
COUNTY OF _King_)

On this _28th_ day of _September_ , _2001_, before me, a Notary Public in and for said county, appeared _____, who is personally known to me to be the same person whose name is subscribed to the foregoing assignment document, and acknowledged that he/she signed and delivered the document as his/her free and voluntary act for the uses and purposes therein set forth.

Melissa Mael
Notary Public

{SEAL}

My Commission Expires: _10-9-01_

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Schedule A - U.S. Patents

	Country	Patent No.	Title	Issue Date
Digital Media	US	5,506,624	Rotating Sample of Video Images	4/9/1996
	US	5,745,713	Movie-Based Facility for Launching Application Programs or Services	4/28/1998
	US	5,774,666	System and Method for Displaying Uniform Network Resource Locators Embedded in Time-Based Medium	6/30/1998
	US	5,987,509	System and Method for Displaying an Active URL During Playback of a Media File or Media Broadcast	11/16/1999
	US	5,808,662	Synchronized, Interactive Playback of Digital Movies Across a Network	9/14/1998
	US	5,943,347	Apparatus and Method for Error Concealment in an Audio Stream	8/24/1999
	US	6,005,600	High Performance Player for Distributed, Time-Based Media	12/21/1999
	US	6,147,695	System and Method for Combining Multiple Video Streams	11/14/2000
	US	6,075,906	System and Method for the Scaling of Image Streams that Use Motion Vectors	6/13/2000
	US	D365,585	Video Camera Used with Personal Computer	12/26/1995
	US	5,604,866	Flow Control System Having a Counter in Transmitter for Decrementing and Incrementing Based Upon Transmitting and Received Message Size Respectively for Indicating Free Space in Receiver	2/18/1997
	US	5,311,329	Digital Filtering for Lenticular Printing	5/10/1994
	US	5,438,429	Digital Filtering for Lenticular Printing	8/1/1995
	US	6,070,002	System Software for Use in a Graphics Computer System Having a Shared System Memory	3/30/2000
Internet	US	5,649,186	System and Method for a Computer-Based Dynamic Information Clipping Service	
	US	5,737,560	Graphical Method and System for Accessing Information on a Communications Network	4/7/1998
	US	5,877,767	Graphical Method and System for Accessing Information on a Communications Network	3/2/1999
	US	5,742,768	System and Method for Providing and Displaying a Web Page Having an Embedded Menu	
	US	5,890,170	Method and Apparatus for Publishing Documents in a Hypertextual Network Environment	3/30/1999
	US	6,026,433	Method of Creating and Editing a Web Site in a Client-Server Environment Using Customizable Web Site Templates	2/15/2000
	US	6,072,491	Method and Computer Program Product for Accessing a Web Site	6/6/2000
	US	6,098,096	Web-Site Delivery	8/1/2000
	US	6,098,092	Server to Dynamically Generate Graphics for the World Wide Web	8/1/2000
	US	6,189,029	Web Survey Tool Builder and Result Compiler	2/13/2001
	US	6,081,829	General Purpose Web Annotations Without Modifying Browser	6/27/2000
	US	6,199,098	Method and Apparatus for Providing an Expandable, Hierarchical Index in a Hypertextual, Client-Server Environment	3/6/2001
	US	6,012,055	Mechanism for Integrated Information Search and Retrieval from Diverse Sources Using Multiple Navigation Methods	1/4/2000
Graphics Rendering	US	4,772,881	Pixel Mapping Apparatus for Color Graphics Display	9/20/1988
	US	5,038,297	Method and Apparatus for Clearing a Region of Z-Buffer	8/6/1991
	US	5,197,126	Clock Switching Circuit for Asynchronous Clocks of Graphics Generation Apparatus	3/23/1993

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Schedule A - U.S. Patents

Country	Patent No.	Title	Issue Date
US	4,771,279	Dual Clock Shift Register	9/13/1988
US	4,951,232	Method for Updating Pipelined Single Port Z-Buffer by Segments on a Scan Line	8/21/1990
US	4,789,927	Interleaved Pipeline Parallel Processing Architecture	12/6/1988
US	5,113,490	Method for Forming a Computer Model from an Intersection of a Cutting Surface with a Bounded Volume	5/12/1992
US	5,182,548	Method and Apparatus for Painting on a Computer	1/26/1993
US	4,991,110	Graphics Processor with Staggered Memory Timing	2/5/1991
US	5,129,059	Graphics Processor with Staggered Memory Timing	7/7/1992
US	5,193,145	Method and Apparatus for Producing a Visually Improved Image in a Computer System	3/9/1993
US	5,847,700	Integrated Apparatus for Displaying a Plurality of Modes of Color Information on a Computer Output Display	12/8/1998
US	5,371,518	Video Timing and Display ID Generator	12/6/1994
US	5,621,432	Method and Apparatus for Generating Display Identification Information	4/15/1997
US	5,051,737	Efficient Graphics Process for Clipping Polygons	9/24/1991
US	5,266,941	Apparatus and Method for Controlling Storage of Display Information in a Computer System	11/30/1993
US	5,394,170	Apparatus and Method for Controlling Storage of Display Information in a Computer System	2/28/1995
US	5,768,552	Graphical Representation of Computer Network Topology and Activity	6/16/1998
US	5,585,824	Graphics Memory Apparatus and Method	12/17/1996
US	5,818,433	Graphics Memory Apparatus and Method	10/6/1998
US	5,307,450	Z-Subdivision for Improved Texture Mapping	4/26/1994
US	5,230,039	Texture Range Controls for Improved Texture Mapping	7/20/1993
US	5,343,558	Method for Scan Converting Shaded Triangular Polygons	8/30/1994
US	5,347,618	Method for Display Rendering by Determining the Coverage of Pixels in Polygons	9/13/1994
US	5,345,252	High Speed Cursor Generation Apparatus	9/6/1994
US	5,285,199	Method and Apparatus for Accomplishing Z-Buffering by Prediction	11/23/1993
US	5,548,709	An Apparatus and Method for Integrating Texture Memory and Interpolation Logic in a Computer System	8/20/1996
US	5,706,481	Apparatus and Method for Integrating Texture Memory and Interpolation Logic in a Computer System	1/6/1998
US	5,684,939	Antialiased Imaging with Improved Pixel Supersampling	11/4/1997
US	6,072,500	Antialiased Imaging with Improved Pixel Supersampling	6/6/2000
US	5,581,680	Method and Apparatus for Antialiasing Raster Scanned Images	12/3/1996
US	5,636,338	Method for Designing Curved Shapes for Use by a Computer	6/3/1997
US	5,515,484	Method and Apparatus for Rendering Volumetric Images	5/7/1996
US	5,369,739	Apparatus and Method for Generating Point Sample Masks in a Graphics Display System	11/29/1994
US	5,528,737	Processor-Based Method for Rasterizing Polygons at an Arbitrary Precision	6/18/1996
US	5,805,782	A Method and Apparatus for Projective Texture Mapping Rendered from Arbitrarily Positioned and Oriented Light Source	9/8/1998
US	5,682,554	Apparatus and Method for Handling Data Transfer Between a General Purpose Computer and a Cooperating Processor	10/28/1997

Country	Patent No.	Title	Issue Date
US	5,457,779	System for Accessing Graphic Data in a SIMD Processing Environment	10/10/1995
US	5,671,401	Apparatus for Efficiently Accessing Graphic Data for Rendering on a Display	9/23/1997
US	5,742,749	A Method and Apparatus for Shadow Generation Through Depth Mapping	4/21/1998
US	5,480,240	A System and Method of Generating Interactive Computer Graphic Images Incorporating Three Dimensional Textures	2/6/1996
US	5,438,654	System and Method for Sharpening Texture Imagery in Computer Generated Interactive Graphics	8/1/1995
US	5,455,827	Programmable Video Output Format Generator	10/3/1995
US	5,471,572	A System and Method for Adding Detail to Textures Imagery in Computer Generated Interactive Graphics	11/28/1995
US	5,704,024	A Method & Apparatus for Generating Reflection Vectors Which can be Unnormalized and For Using These Reflection Vectors to Index Locations on an Environment Map	12/30/1997
US	5,649,082	An Efficient Algorithm for Computer Texture Coordinates for Lines & Polygons	7/15/1997
US	5,528,738	Method and Apparatus for Antialiasing Raster Scanned, Polygonal Shaped Images	6/18/1996
US	5,619,597	Method for Sampling a Uniform Spatially-Distributed Sequence of Pixels in a Block	8/8/1997
US	5,710,876	A Computer Graphics System for Rendering Images Using Full Spectral Illumination Data	1/20/1998
US	5,835,133	Optical System for Single Camera	11/10/1998
US	5,608,461	Programmable Video Frame Detector	3/4/1997
US	5,703,810	Improved DRAM for Texture Mapping	12/30/1997
US	5,943,058	Texture Mapping Circuit for Performing Data Interpolations	8/24/1999
US	5,982,939	System and Method for Antialiasing of Texture Edges	11/9/1999
US	5,844,567	Computer Graphics System and Method for Texture Mapping Using Triangular Interpolation	12/1/1998
US	5,819,017	Apparatus and Method for Selectively Storing Depth Information of a 3-D Image	10/6/1998
US	5,877,771	A Method and Apparatus for Supersampling Based on the Local Rate of Change in Texture	3/2/1999
US	5,760,783	A Method and Apparatus for Providing Texture Using a Selected Portion of a Texture MIP-MAP	6/2/1998
US	5,818,613	System and Method for Color Space Conversion	10/6/1998
US	5,736,988	Apparatus and Method for Accelrated Tiled Data Retrieval	4/7/1998
US	5,657,479	Hierarchical Display List Processing in Graphics Data Retrieval System	8/12/1997
US	5,936,626	Computer Graphics Silhouette Load Management	8/10/1999
US	5,845,874	System and Method for Creating Visual Images of Aircraft Wake Vortices	12/8/1998
US	6,226,003	Method for Rendering Silhouette and True Edges of 3-D Line Drawings with Occlusion	5/1/2001
US	6,131,189	System and Method to Efficiently Represent Aliases and Indirect Memory Operations in Static Single Assignment Form During Compilation	10/10/2000
US	5,946,113	System and Method for Color Space Conversion Using an Extended Color Space	8/31/1999
US	6,147,772	System and Method for Color Space Conversion Using an Extended Color Space	11/14/2000
US	5,831,620	System and Computer-Based Method for Creating Real-Time Mirror Reflections	11/3/1998

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Country	Patent No.	Title	Issue Date
US	5,815,162	Computational Low-Cost Anti-Aliased Bresenham Line Algorithm	9/29/1998
US	6,249,289	Multi-Purpose High Resolution Distortion Correction	6/19/2001
US	5,949,424	Method, System and Computer Program Product for Bump Mapping in Tangent Space	9/7/1999
US	5,880,736	Method, System and Computer Program Product for Shading	3/9/1999
US	6,163,319	Method, System and Computer Program Product for Shading	12/19/2000
US	6,104,417	Unified Memory Computer Architecture with Dynamic Graphics Memory Allocation	8/15/2000
US	6,154,794	Upstream Situated Apparatus and Method within a Computer System for Controlling Data Flow to a Downstream Situated Input/Output Unit	11/28/2000
US	6,078,331	A Method and System for Efficiently Drawing Subdivision Surfaces for 3D Graphics	6/20/2000
US	6,078,332	Real-Time Lighting Algorithm Using 3D Texture Mapping	6/20/2000
US	6,175,367	A Method and System for Real Time Illumination of Computer Generated Images	1/16/2001
US	6,002,406	System and Method for Storing and Accessing Data Representative of an Object in Various Levels of Detail	12/14/1999
US	6,154,215	Method and Apparatus for Maintaining Multiple Representations of a Same Scene in Computer Generated Graphics	11/28/2000
US	6,057,850	Blended Texture Illumination Mapping	5/2/2000
US	5,907,562	Latching Assembly for a Computer	6/1/1999
US	6,215,495	A Platform Independent Application Program Interface for Interactive 3D Scene Management	4/10/2001
US	6,108,007	Method, Sytem and Computer Program Product for Increasing Interpolation Precision Using Multi-Channel Texture Mapping	8/22/2000
US	6,104,415	Method for Accelerating Minified Textured Cache Access	8/15/2000
US	6,232,981	Method for Improving Texture Locality for Pixel Quads by Diagonal Level of Detail Calculation	5/15/2001
US	6,232,979	Method, System and Computer Program Product for Fast Computation Using Parallel Multi-Channel Resampling and Blending	5/15/2001
US	6,246,415	Method and Apparatus for Culling Polygons	6/12/2001
US	6,236,413	Method and System for a RISC Graphics Pipeline Optimized for High Clock Speeds by Using Recirculation	5/22/2001
US	6,075,546	A Packetized Command Interface to a Graphics Processor	6/13/2000
US	6,230,177	Method and Apparatus for Performing Fast Fourier Transforms	5/8/2001
US	6,252,610	Method and Apparatus for Efficiently Switching State in a Graphics Pipeline	6/26/2001
US	6,128,638	Method and Apparatus for Calculating X to the Exponent of Y	10/3/2000
US	6,133,901	Method and System for Width Independent Antialiasing	10/17/2000
US	6,091,425	Constant Multisample Image Coverage Mask	7/18/2000
US	6,205,531	Method and Apparatus for Virtual Address Translation	3/20/2001
US	6,256,656	Apparatus and Method for Extending Computational Precision of a Computer System Having a Modular Arithmetic Processing Unit	7/3/2001
US	6,229,547	System and Method for Rendering Multi-Planar Reformations Using Bi-Linear Interpolation	5/8/2001

Schedule A - U.S. Patents

Country	Patent No.	Title	Issue Date
US	6,268,861	Volumetric Three-Dimensional Fog Rendering Technique	7/31/2001
US	6,163,320	Method and Apparatus for Radiometrically Accurate Texture-Based Lightpoint Tendering Technique	12/19/2000

	Country	Application No.	Title	Filing Date
	US	196100	"Pen-Based Interface for a Notepad Computer"	11/20/1998
Tablet Computing	US	196114	"Pen-Based Computer System"	11/20/1998
Graphics Rendering	US	09/005129	System and Method for the Direct Rendering of Curve Bounded Objects	1/9/1998
	US	191456	Floating Point Gamma Correction Method And System	11/12/1998
	US	09/217398	High Precision Texture Wrapping Method And Device	12/21/1998
	US	265487	Method And Device For Associating A Pixel With One Of A Plurality Of Regions In A Logarithm Or Cosine Space	3/9/1999
	US	072050	Method and System For Providing Texture Using A Selected Portion of a Texture Map	5/5/1998
	US	033663	Improved Chroma-Key Suppression Method and Apparatus	3/3/1998
	US	09/244275	Memory Chip For Use in a Unified Memory Architecture	2/3/1999
	US	244281	Memory Controller for Controlling Memory in a Computer System Having a Unified Memory Architecture	2/3/1999
	US	244254	I/O Chip in a Computer System Having a Unified Memory Architecture	2/3/1999
	US	220078	System and Method for Morphing Based on Multiple Weighted Parameters	12/23/1998
	US	845526	A Method and System for Efficiently Evaluating and Drawing Nurbs Surfaces for 3D Graphics	4/25/1997
	US	899123	System and Method for Displaying Different Portions of an Object In Different LOD Levels	7/23/1997
	US	070808	System and Method for Displaying Different Portions of an Object in Different Levels of Detail	5/1/1998
	US	074027	Occlusion Culling For Complex Transparent Scenes in Computer Generated Graphics	5/8/1998
	US	137005	Method and System for Performing Rasterization in Producing Three-Dimensional Graphics Using YUV Color Space and Combining Same with Digital Video in YUV Color Space	8/20/1998
	US	035376	Subsampled Texture Edge Antialiasing	3/5/1998
	US	956537	Method and Apparatus for Providing Image and Graphics Processing Using a Graphics Rendering Engine	10/23/1997
	US	937793	Method, System and Computer Program Product for Providing Illumination In Computer Graphics Shading and Animation	9/25/1997
	US	09/048099	Method for Efficient Handling of Texture Cache Misses by Recirculation	3/26/1998
	US	09/081073	Method and Apparatus for Line Antialiasing by Gamma-Corrected Area Calculation	5/18/1998
	US	246136	System and Method for Rendering an Image	2/8/1999
	US	09/448907	A Packetized Command Interface to a Graphics Processor	11/23/1999
	US	09/549156	A Packetized Command Interface to a Graphics Processor	4/13/2000
	US	09/145516	Method and Apparatus For Rasterizing in a Hierarchical Tile Order	9/2/1998
	US	978755	Range Correct Layered Fog Model Using 3D Texture	11/26/1997
	US	111284	Backface Primitives Culling	7/6/1998
	US	201814	Multi-Threaded Texture Modulation for Axis Aligned Volume Rendering	12/1/1998
	US	247422	Multisample Dither Method With Exact Reconstruction	2/10/1999

Country	Application No.	Title	Filing Date
US	09/227227	Method and Apparatus For Synchronizing Graphics Pipelines	1/8/1999
US	218121	Scaleable Network Based Computer Graphics System	12/21/1998
US	346071	Computer System Having A Distributed Texture Memory Architecture	7/1/1999
US	09/707418	Method and Apparatus for Radiometrically Accurate Texture-Based Lightpoint Rendering Technique	11/6/2000
US	348882	Antialiasing Method Using Barycentric Coordinates Applied to Lines	7/1/1999
US	08/220596	System and Method For Transitioning Between Two Filters, Allowing For The Use of Higher Order Interpolation	12/28/1998
US	09/416055	Method, System, and Computer Program Product For Compositing True Colors and Intensity-Mapped Colors Into A Frame Buffer	10/12/1999
US	218042	System and Method For Locking Disparate Video Formats	12/22/1998
US	09/247885	Method For Interfacing to Ultra-High Resolution Output Devices	2/10/1999
US	232860	Method For Tilting Multiple Displays to Generate a Large Area Display of Moving Data	1/15/1999
US	294546	Combined Floating-Point Logic Core and Frame Buffer	4/19/1999
US	09/294450	Apparatus and Method for Sharing Antialiasing Memory Across Multiple Displays	4/19/1999
US	277567	Transformation Pipeline for the Computing Distortion Correction Geometry for any Design Eyepoint, Display Surface Geometry and Projector Position	3/26/1999
US	385270	Antialiasing Method for Computer Graphics	3/23/1999
US	09/220156	Processor for Geometry Transformations and Lighting Calculations	12/23/1998
US	283185	System and Method for Maintaining Time Dependencies in Conversions That Include Parallel Operations	3/5/1999
US	09/467561	A Method and System for Efficiently Implementing Two Sided Vertex Lighting in Hardware	12/20/1999
US	275725	Method and Apparatus for Texture Memory Management	3/24/1999
US	09/247816	Method and Apparatus for Early Culling of Occluded Objects	2/9/1999
US	348641	Method and System for Generating Light Values for a Set of Vertices	7/1/1999
US	273247	Method and System for Dynamic Clock Frequency Adjustment for a Graphics Subsystem in a Computer	3/19/1999
US	306987	Fine Grain Multi-Pass for Multiple Texture Rendering	5/7/1999
US	344005	Method and System for Dynamic Texture Replication on a Distributed Memory Graphics Architecture	6/24/1999
US	345366	Cache Memory For High Latency and Out-of-Order Return of Texture Data	7/1/1999
US	328000	Method for Virtual Clipping A Three-Dimensional Graphics Image	6/8/1999
US	09/502497	A Method and System For Efficient Simplification of Tetrahedral Meshes Used In 3D Volumetric Representations	2/11/2000

	Country	Application No.	Title	Filing Date
	US	09/377778	Method, System and Computer Program Product for Multi-Pass Bump-Mapping into an Environment Map	8/20/1999
	US	328164	Method and Apparatus for a Modified Linear Filter Using Texture Data as Phase Angle	8/8/1999
	US	303994	View-Dependent Layer Ordering Method and System	5/3/1999
	US	300916	Method and System for Iterative Morphing	4/28/1999
	US	293889	Apparatus and Method for Increasing the Bandwidth to a Graphics Subsystem	4/19/1999
	US	265493	Device, Method and System for Generating Per-Pixel Light Values Using Texture Parameters	3/9/1999
	US	386379	Method, System, and Computer Program Product for Efficient Buffer Level Management of Memory-Buffered Graphics Data	8/31/1999
	US	386378	Method, System and Computer Program Product for Overlapping Graphics Data Collection and Transmission Using a Single Processor	8/31/1999
	US	220082	Method, System and Computer Program Product for Modified Blending Between Clip-Map Tiles	12/23/1998
	US	09/369359	Reflection Space Image Based Rendering	8/6/1999
	US	09/727985	Texture Generating Apparatus For Dynamic Interference Checking	11/30/2000
	US	09/675979	Method and System for Evaluating Derivatives in Screen Space Using Perspective Corrected Barycentric Coordinates	9/29/2000
	US	363636	Method and System for Transforming Color Coordinates by Direct Calculation	7/30/1999
	US	09/576740	Cheap, Well-Behaved Affine Transformation of Bounding Spheres	5/23/2000
	US	348885	Dual Mode Device and Method for Generating Vector Cross Products or DOT Products	7/1/1999
	US	408951	System and Method for Load Balancing in a Multi-Channel Graphics System	9/30/1999
	US	09/404808	Method, System, and Computer Program Product for Using Alpha Values to Control Pixel Blending	9/24/1999
	US	09/461345	Method, System, and Computer Program Product for Generating Spatically Varying Effects in a Digital Image	12/15/1999
	US	09/565562	Method and Apparatus for Rendering a Quadrangle Primitive	5/4/2000
	US	60/295854	Reducing Fill and Improving Quality of Interlaced Displays Using Multi-Sampling	6/6/2001
	US	09/832138	Scene Representation Method and System	4/10/2001
	US	09/569649	Method and System for Implementing Graphics Control Constructs	5/12/2000
	US	09/569650	Table Indexing System and Method	5/12/2000
	US	09/569521	Method and System for Accelerating Noise	5/12/2000
	US	09/569520	Data Retrieval Method and System	5/12/2000
	US	09/569654	Extended Range Pixel Display Method and System	5/12/2000
	US	09/606988	Method, System and Computer Program Product for Implementing Derivative Operators with Graphics Hardware	6/29/2000
	US	09/838907	Method and System for Executing SIMD Instruction Using Graphics Technology	8/15/2000
	US	09/572452	Method, System, and Computer Program Product for Simulating Camera Depth-of-Field Effects in a Digital Image	5/17/2000
	US	09/469558	An Efficient Graphics Pipeline With a Pixel Cache and Data Pre-Fetching	12/22/1999

	Country	Application No.	Title	Filing Date
	US	09/470948	A System and Method for Linearly Mapping a Tiled Image Buffer	12/22/1999
	US	09/473209	A Graphics Geometry Cache	12/27/1999
	US	09/473210	View Volume Clip-Check In Object Space	12/27/1999
	US	09/684810	Method, System, and A Computer Program Product For Filtering A Texture Applied To A Surface Of A Computer Generated Object	10/10/2000
	US	09/599971	Method and System for Performing Multi-Texturing Operations Using Recursive Interleaving	6/21/2000
	US	09/688978	System and Method for Efficiently Controlling a Graphics Rendering Pipeline	10/17/2000
	US	60/255883	Method, System and Computer Program Product for Determining Regions That Are Occluded From An Observation Point	12/18/2000
	US	09/684812	Method, System, and Computer Program Product for Anistropic Filtering and Applications Thereof	10/10/2000
	US	60/253946	System, Method, and Computer Program Product For General Environment Mapping	11/30/2000
	US	60/258323	Hardware-Accelerated Volume Lighting Algorithm	12/28/2000
	US	60/252094	Rendering Volumetric Fog and Other Gaseous Phenomena	11/21/2000
	US	60/238128	Texture Tiling With Adjacency Information	10/6/2000
	US	60/298416	A Volumetric Based Method and System for Visualizing Datasets	6/18/2001
	US	60/252092	Rendering Volumetric Fog and Other Gaseous Phenomena Using an Alpha Channel	11/21/2000
	US	60/252093	Method, System, and Computer Program Product for Rendering Multicolored Layered Fog with Self-Shadowing and Scene Shadowing	11/21/2000
Internet	US	357529	General Purpose Web Annotations Without Modifying Browser	7/19/1999
	US	09/557149	Graphical Method and System for Accessing Information on a Communications Network	4/25/2000
Digital Media	US	09/415037	System and Method for Media Stream Indexing and Synchronization	10/7/1999
	US	09/632558	Workstation for Processing and Producing a Video Signal	8/4/2000
	US	09/632662	System and Method for Pre-Processing a Video Signal	8/4/2000
	US	09/632462	System and Method for Producing a Video Signal	8/4/2000
	US	09/632451	System and Method for Packing and Unpacking Video Data	8/4/2000
	US	08/900421	Synchronizing Motion and Time-Based Data for Transfer Between a Server and a Client	7/25/1997
	US	09/441729	Seamless Payback of Multiple Clips of Media Data Across a Data Network	11/16/1999
	US	09/441722	Frame-Accurate Transport of Media Data Across a Data Network	11/16/1999
	US	08/020072	Backfilling Network Movie Player	2/6/1998
	US	035687	Preemptive Time Multiplexed Shared Memory Access	3/5/1998
	US	09/427197	Video Assistance System with Computer Generated Imagery Overlay	10/25/1999
	US	09/099742	System and Method Using a Packetized Encoded Bitstream for Parallel Compression and Decompression	6/18/1998
	US	09/518309	A Method and System for Efficiently Streaming 3D Animation Across a Wide Area Network	3/6/2000
	US	09/466398	Constant Bitrate Algorithm for Block Based Image Compression	12/17/1999
	US	09/539365	System and Method for Communicating Video Data in a Digital Media Device	3/31/2000

Schedule A - Pending Patent Applications

	Country	Application No.	Title	Filing Date
	US	09/577171	Cost-Optimal Convolution Algorithm With Low or Null Latency	5/23/2000
	US	09/544360	A Technique For Controlling Media Data Streams Using Embedded Controls	4/6/2000
	US	09/521234	Apparatus and Method for Recognizing Color Space of a Digital Video Input	3/8/2000
	US	09/628796	System and Method for Compressing Data	7/28/2000
	US	09/628658	System and Method for Storing Compressed Data onto a Storage Medium	7/28/2000
	US	60/281105	Method and Apparatus for Producing Digital Video from a General Digital Graphics Interface	

Country	Appl/Patent No.	Title	Foreign Filing Date	Issue Date	Status
EPO	98949509.8	Method, System And Computer Program Product For Providing Illumination In Computer Graphics Shading And Animation	9/25/1998		Abandoned
Japan	2000-513245	Method, System And Computer Program Product For Providing Illumination In Computer Graphics Shading And Animation	9/25/1998		Pending
PCT	US98/20096	Method, System And Computer Program Product For Providing Illumination In Computer Graphics Shading And Animation	9/25/1998		Pending
France	99942475.7	Method And Apparatus For Rasterizing In A Hierarchical Tile Order	5/17/2000		Pending
Japan	2000-568069	Method And Apparatus For Rasterizing In A Hierarchical Tile Order	6/2/2000		Pending
PCT	US99/19353	Method And Apparatus For Rasterizing In A Hierarchical Tile Order	8/23/1999		Pending
UK	99942475.7	Method And Apparatus For Rasterizing In A Hierarchical Tile Order	5/17/2000		Pending
EPO	903207.9	Method And Apparatus For Synchronizing Graphics Pipelines	7/11/2001		Pending
Japan		Method And Apparatus For Synchronizing Graphics Pipelines	7/9/2001		Pending
PCT	US00/00549	Method And Apparatus For Synchronizing Graphics Pipelines	1/7/2000		Pending
PCT	US00/10634	Combined Floating-Point Logic Core And Frame Buffer	4/19/2000		Pending
PCT	US00/107904	Method And Apparatus For Texture Memory Management	3/24/2000		Pending
PCT	US00/10379	Apparatus And Method For Increasing The Bandwidth To A Graphics Subsystem	4/19/2000		Pending
PCT	US00/06184	Device, Method And System For Generating Per-Pixel Light Values Using Texture Parameters	3/8/2000		Abandoned
PCT	US00/40788	Method, System And Computer Program Product For Overlapping Graphics Data Collection And Transmission Using A Single Processor	8/31/2000		Pending
PCT	US99/29984	Method, System And Computer Program Product For Modified Blending Between Clip-Map Tiles	12/17/1999		Pending
PCT	US00/21361	Workstation For Processing And Producing A Video Signal	8/4/2000		Abandoned
PCT	US00/21362	System And Method For Pre-Processing A Video Signal	8/4/2000		Abandoned
PCT	US00/21363	System And Method For Producing A Video Signal	8/4/2000		Abandoned
PCT	US00/21360	System And Method For Packing And Unpacking Video Data	8/4/2000		Abandoned
EPO	99909763.7	Preemptive Time Multiplexed Shared Memory Access	3/2/1999		Pending
Japan	2000-534947	Preemptive Time Multiplexed Shared Memory Access	3/2/1999		Pending
PCT	US99/04815	Preemptive Time Multiplexed Shared Memory Access	3/2/1999		Pending
PCT		System And Method For Compressing Data	7/26/2001		Pending
PCT		System And Method For Storing Compressed Data Onto A Storage Medium	7/27/2001		Pending
Canada	1290870	Pixel Mapping Apparatus For Color Graphics		10/15/1991	Granted
Germany	DE3736185	Pixel Mapping Apparatus For Color Graphics		11/27/1997	Granted
Hong Kong	527	Pixel Mapping Apparatus For Color Graphics		6/3/1993	Granted
Japan	2913096	Pixel Mapping Apparatus For Color Graphics		4/16/1999	Granted
Singapore	2193319	Pixel Mapping Apparatus For Color Graphics		12/26/1991	Granted
UK	2198319	Pixel Mapping Apparatus For Color Graphics		5/29/1991	Granted
India	172327	Dual Clock Shift Register		5/27/1994	Granted
EPO	433373	Method For Updating Pipelined Single Port Z-Buffer By Segments On A Scan Line		5/29/1996	Granted
France	433373	Method For Updating Pipelined Single Port Z-Buffer By Segments On A Scan Line		5/29/1996	Granted
Germany	DE68926571	Method For Updating Pipelined Single Port Z-Buffer By Segments On A Scan Line		5/29/1996	Granted

Country	Appl/Patent No.	Title	Foreign Filing Date	Issue Date	Status
Japan	2884250	Method For Updating Pipelined Single Port Z-Buffer By Segments On A Scan Line		2/12/1999	Granted
Korea	191820	Method For Updating Pipelined Single Port Z-Buffer By Segments On A Scan Line		12/4/1997	Granted
Switzerland	433373	Method For Updating Pipelined Single Port Z-Buffer By Segments On A Scan Line		5/29/1998	Granted
Canada	1276312	Interleaved Pipeline Parallel Processing Architecture		11/13/1990	Granted
EPO	95912783.8	An Apparatus And Method For Integrating Texture Memory And Interpolation Logic In A Computer System	3/7/1995		Pending
PCT	US95/02853	An Apparatus And Method For Integrating Texture Memory And Interpolation Logic In A Computer System	3/7/1995		Abandoned
JP	9510309	An Apparatus And Method For Integrating Texture Memory And Interpolation Logic In A Computer System	3/7/1995		
EPO	96926183	Apparatus And Method For Selectively Storing Depth Information Of A 3-D Image	8/15/1995		Abandoned
PCT	US96/13245	Apparatus And Method For Selectively Storing Depth Information Of A 3-D Image	8/15/1995		Abandoned
EPO	96939541.7	A Method And Apparatus For Providing Texture Using A Selected Portion Of A Texture Mip-Map	11/6/1996		Abandoned
PCT	US96/17673	A Method And Apparatus For Providing Texture Using A Selected Portion Of A Texture Mip-Map	11/6/1996		Abandoned
EPO	97917591.8	System And Method For Color Space Conversion Using An Extended Color Space	3/28/1997		Abandoned
PCT	US97/04891	System And Method For Color Space Conversion Using An Extended Color Space	3/28/1997		Abandoned
Canada	2214868	Unified Memory Computer Architecture With Dynamic Graphics Memory Allocation	9/9/1997		Pending
EPO	97306897.6	Unified Memory Computer Architecture With Dynamic Graphics Memory Allocation	9/5/1997		Pending
Japan	251134.97	Unified Memory Computer Architecture With Dynamic Graphics Memory Allocation	8/18/1997		Pending
Mexico	976495	Unified Memory Computer Architecture With Dynamic Graphics Memory Allocation	8/28/1997		Pending
PCT	US99/15075	Method And Apparatus For Virtual Address Translation	7/1/1999		Abandoned
PCT	US99/19502	System and Method for Combining Multiple Video Streams	8/26/1999		Abandoned
PCT	US96/8946	Digital Filtering for Lenticular Printing	8/18/1992		Abandoned
AU	9225465	Digital Filtering for Lenticular Printing	8/18/1992		Abandoned
PCT	US89/3924	Method and Apparatus for Clearing a Region of Z-Buffer	9/12/1989		Abandoned
EP	551251	Method and Apparatus for Clearing a Region of Z-Buffer	9/12/1989	2/7/1996	Abandoned
DE	68925651	Method and Apparatus for Clearing a Region of Z-Buffer	9/12/1989	3/21/1996	Abandoned
PCT	WO90/02891	Graphics Processor with Staggered Memory Timing	published 3/22/1990		Abandoned
PCT	WO91/12688	Method and Apparatus for Producing a Visually Improved Image in a Computer System	published 8/22/1991		Abandoned
AU	9173134	Method and Apparatus for Producing a Visually Improved Image in a Computer System	published 9/3/1991		Abandoned
PCT	US00/18745	Computer System Having A Distributed Texture Memory Architecture	8/18/2000		Pending